Report Date: 01 Feb 2013

Summary Report for Individual Task
071-326-0512
Estimate Range
Status: Approved

Condition: You are a member of a squad and have been directed to estimate range. All targets are stationary and either partially or fully exposed, at ranges from 50 to 3,000 meters, during daylight or night, with good visibility. Some iterations of this task should be performed in MOPP.

Standard: Determine the range to each target with no more than a 20-percent error (plus or minus).

Special Condition: None

Special Standards: None

Special Equipment:

Safety Level: Low

MOPP: Sometimes

Task Statements

Cue: None

DANGER

None

WARNING

None

CAUTION

None

Remarks: None

Notes: Estimating range is one of the most difficult skills to learn, but it is an indispensable one to have when it is needed. Your estimates will be easier to make and more accurate if you know various range-estimation techniques.

Performance Steps

1. Identify the five methods of estimating range.

    a. 100-meter unit-of-measure method.

    b. Appearance-of-objects method.

    c. Flash-and-sound method.

    d. Mil-relation method.

    e. Combination of methods.

2. Identify the three factors that affects range estimates.

    a. The nature of the Object.

        (1) Outline - An object of regular outline, such as a house, appears closer than one of irregular outline, such as a clump of trees.

        (2) Contrast - A target that contrasts with its background appears to be closer than it actually is.

        (3) Exposure - A partly exposed target appears more distant than it actually is.

    b. The nature of Terrain.

        (1) Contoured terrain - Looking across contoured terrain makes an object seem farther.

        (2) Smooth terrain - Looking across smooth terrain, such as sand, water, or snow, makes a distant object seem nearer.

        (3) Downhill - Looking downhill at an object makes it seem farther.

        (4) Uphill - Looking uphill at an object makes it seem nearer.

    c. The Light Conditions.

        (1) Sun behind observer - A front-lit object seems nearer.

        (2) Sun behind object - A back-lit object seems farther away.

3. Demonstrate the 100-Meter-Unit-of-Measure Method.

    Note: To use this method, the Soldier must be able to visualize a distance of 100 meters on the ground.

    a. Determine what a 100-meter distance looks like on the ground(Figure 1).

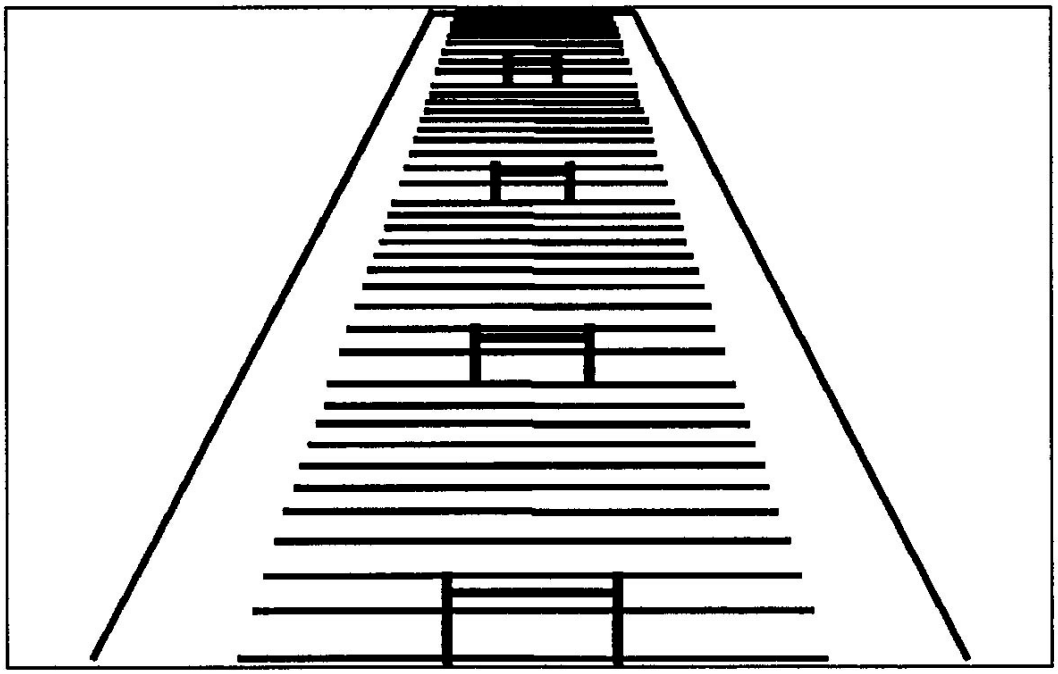

Figure 1. Football field method.

b. Estimate the number of 100 meter lengths between you and your target, you want to measure for ranges up to 500 meters.

c. Select a point halfway to the target(Figure 2).

Note: The accuracy of the 100-meter method depends on how much ground is visible. This is most true at long ranges. If a target is at a range of 500 meters or more, and you can only see part of the ground between yourself and the target, it is hard to use this method with accuracy.

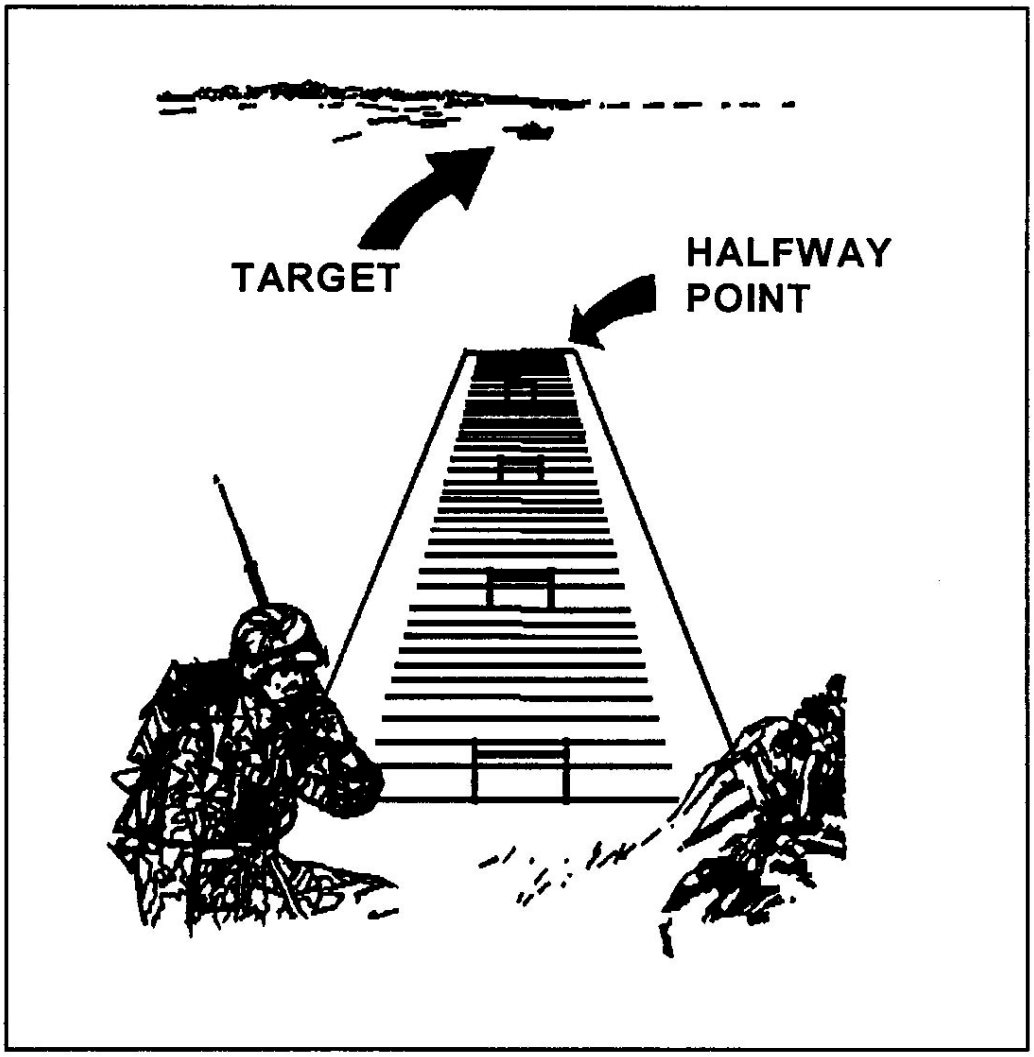

Figure 2. Halfway-point method.

d. Determine the number of 100-meter lengths to the halfway point.

e. Double that number to get the range to the target beyond 500 meters.

f. Determine the effects of terrain and weather conditions on target appearance(Figure 3).

CONDITIONS IN WHICH TARGETS SEEM CLOSER	CONDITIONS IN WHICH TARGETS SEEM FARTHER AWAY
Bright, clear, daylight conditions	Foggy, rainy, hazy, or twilight conditions
Targets with sun in front of them	Targets with sun behind them
Targets at higher elevations	Targets at lower elevations
Large targets	Small targets
Brightly colored targets (white, red, yellow)	Darkly colored targets
Targets that have contrast	Camouflaged targets
Targets viewed across a ravine, hollow, river, or depression	
Targets at sea	

Figure 3. Effects of terrain and weather on target appearance.

4. Demonstrate the Appearance-of-Object method(Figure 4).

Note: To use the appearance-of-objects method, you must be familiar with characteristic details of objects as they appear at various ranges.

You must be able to see those details to make the method work, anything that limits visibility (such as weather, smoke, or darkness) will limit the effectiveness of this method. If you know the apparent size and detail of troops and equipment at known ranges, then you can compare those characteristics to similar objects at unknown ranges. When the characteristics match, the range does also.

RANGE (in meters)	*WHAT YOU SEE*
200	Clear in all detail such as equipment, skin color
300	Clear body outline, face color good, remaining detail blurred
400	Body outline clear, other details blurred
500	Body tapered, head indistinct from body
600	Body a wedge shape, with no head apparent
700	Solid wedge shape (body outline)

Figure 4. Appearance of a body using appearance-of-objects method.

5. Demonstrate the Flash-to-Sound method.

Note: Use this method to determine range to an explosion or enemy fire. This method is best at night.

a. Observe the flash of the target or weapon firing and immediately starting counting.

b. Count the seconds until you hear the weapon fire(Figure 5).

Note: Sound travels at the speed of 340 meters per second. Light travels much faster.

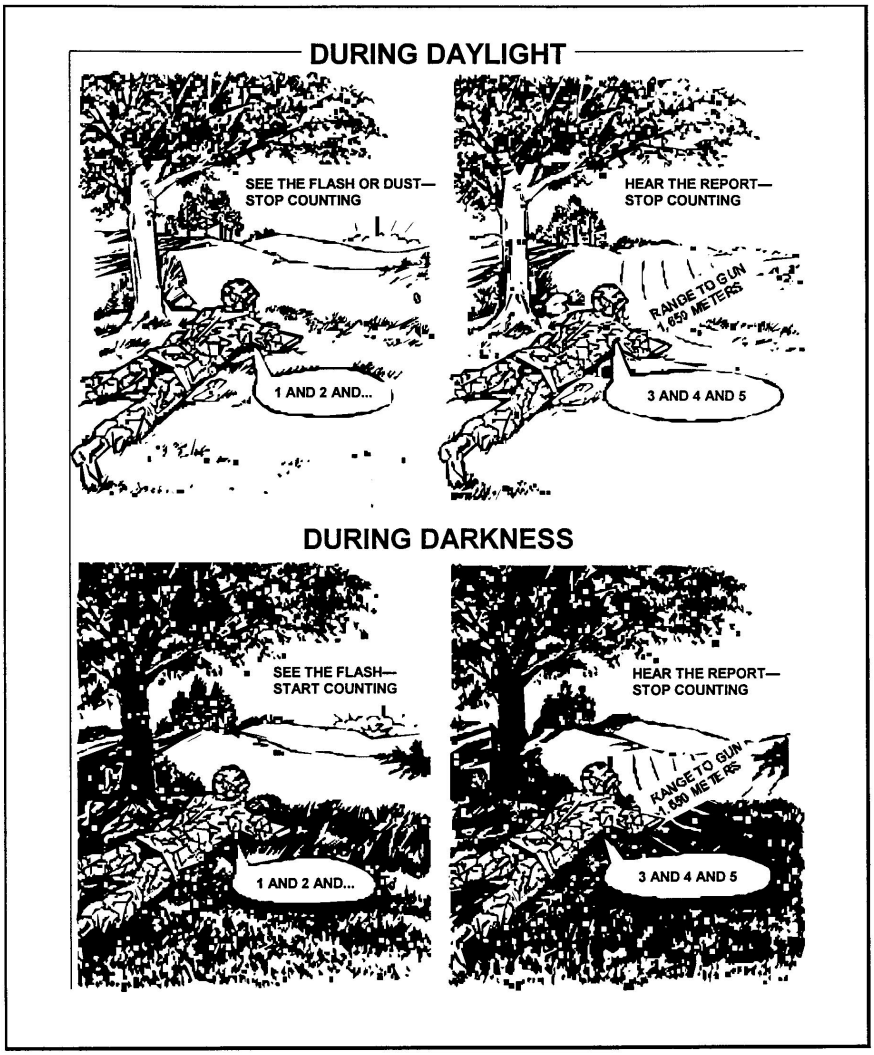

Figure 5. Flash-to-bang method.

c. Stop counting when you hear the sound associated with the action.

d. Multiply the number of seconds by 330 meters to get the approximate range.

Note: EXAMPLE: If you stop at one, the distance is about 300 meters. If you stop at three, the distance is about 900 meters.

6. Demonstrate the Mil-Relation method.

Note: This is the easiest and best way to estimate range.

a. Divide the estimated height of the target in meters (obtained using the reticle in the M22 binoculars) by the size of the target in mils.

b. Multiply by 1,000 to get the range in meters.

7. Demonstrate a Combination of Methods.

Note: If the terrain limits the use of the 100-meter unit-of-measure method, and poor visibility limits the use of the appearance-of-objects method, you may have to use a combination of methods.

(Asterisks indicates a leader performance step.)

Evaluation Preparation: SETUP: Provide the Soldier with the equipment and/or materials described in the conditions statement.

BRIEF SOLDIER: Tell the Soldier what is expected of him by reviewing the task standards. Stress to the Soldier the importance of observing all cautions, warnings, and dangers to avoid injury to personnel and, if applicable, damage to equipment.

PERFORMANCE MEASURES	GO	NO-GO	N/A
1. Identified the five methods of estimating range.			
2. Identified the three factors that affects range estimates.			
3. Demonstrated the 100-Meter-Unit-of-Measure Method.			
4. Demonstrated the Appearance-of-Object Method.			
5. Demonstrated the Flash-to-Sound Method.			
6. Demonstrated the Mil-Relation Method.			
7. Demonstrated the Combination of Methods.			

Supporting Reference(s):

Step Number	Reference ID	Reference Name	Required	Primary
	FM 3-21.75	THE WARRIOR ETHOS AND SOLDIER COMBAT SKILLS	No	Yes
	FM 3-25.26	MAP READING AND LAND NAVIGATION	No	Yes

Environment: Environmental protection is not just the law but the right thing to do. It is a continual process and starts with deliberate planning. Units will assess environmental risk using the checklist in TC 3-34.489 and assessment matrixes in FM 3-34.5, Appendix D. Always be alert to ways to protect our environment during training and missions. In doing so, you will contribute to the sustainment of our training resources while protecting people and the environment from harmful effects.

Safety: In a training environment, leaders must perform a risk assessment in accordance with FM 5-19, Composite Risk Management. Leaders will complete a DA Form 7566 COMPOSITE RISK MANAGEMENT WORKSHEET during the planning and completion of each task and sub-task by assessing mission, enemy, terrain and weather, troops and support available-time available and civil considerations, (METT-TC). Note: During MOPP training, leaders must ensure personnel are monitored for potential heat injury. Local policies and procedures must be followed during times of increased heat category in order to avoid heat related injury. Consider the MOPP work/rest cycles and water replacement guidelines IAW FM 3-11.4, NBC Protection, FM 3-11.5, CBRN Decontamination.

Prerequisite Individual Tasks :

Task Number	Title	Proponent	Status
071-COM-1005	Determine a Location on the Ground by Terrain Association	071 - Infantry (Individual)	Approved

Supporting Individual Tasks :

Task Number	Title	Proponent	Status
071-329-1015	Locate an Unknown Point on a Map and on the Ground by Resection	071 - Infantry (Individual)	Approved
071-001-0008	Detect Targets Using Bradley Fighting Vehicle (BFV) Sighting Systems	071 - Infantry (Individual)	Approved

Supported Individual Tasks :

Task Number	Title	Proponent	Status
071-120-0210	Operate a Computed Air Release Point Drop Zone	071 - Infantry (Individual)	Approved
071-COM-0030	Engage Targets with an M16-Series Rifle/M4-Series Carbine	071 - Infantry (Individual)	Approved
071-332-5000	Prepare an Operation Overlay	071 - Infantry (Individual)	Approved

331-NCO-0014	Prepare an Operational Overlay	331 - Special Warfare (Individual)	Approved

Supported Collective Tasks :

Task Number	Title	Proponent	Status
07-5-1107.P	Move Tactically (LRS)	07 - Infantry (Collective)	Analysis
07-5-1102	Created from Template: Conduct Helicopter Insertion	07 - Infantry (Collective)	Analysis

ICTL Data :

ICTL Title	Personnel Type	MOS Data
Armor 2LT	Officer	AOC: 19B, Rank: 2LT
Cavalry Scout, SL1	Enlisted	MOS: 19D, Skill Level: SL1
M1 Armor Crewman, SL1	Enlisted	MOS: 19K, Skill Level: SL1
MOS 74D - Chemical Operations Specialist - SL1	Enlisted	MOS: 74D, Skill Level: SL1
11A Officer Lieutenant, Version 1.00	Officer	AOC: 11A, Rank: 1LT
19D10 Calvary Scout, Version 1.00	Enlisted	MOS: 19D, Skill Level: SL1
19K10 Armor Crewman, Version 1.00	Enlisted	MOS: 19K, Skill Level: SL1
11B10, Infantryman - Version 1.00	Enlisted	MOS: 11B, Skill Level: SL1
19A Officer Lieutenant, Version 1.00	Officer	AOC: 19A, Rank: 1LT
19K10 Armor Crewman, Version 1.00	Enlisted	MOS: 19K, Skill Level: SL1